

AMENDMENTS TO THE CLAIMS

1. **(Currently amended)** A process for producing enzyme particles, which process comprising includes

providing an emulsion of droplets of a first liquid phase dispersed in a second liquid phase, with the one liquid phase being a hydrophilic phase and the other liquid phase being a hydrophobic phase which is immiscible with the hydrophilic phase, and with enzyme molecules being located at or within interfacial boundaries of the droplets and the second liquid phase;

cross-linking the enzyme molecules of the respective droplets so that individual enzyme particles, which are stable and in which the enzymes are immobilized with a majority of active sites of the enzymes being orientated either internally or externally, are formed from individual droplets; and

recovering the individual enzyme particles from the second liquid phase.

2. **(Currently amended)** A The process according to Claim 1, wherein the individual particles have openings so that the liquid phases can pass in or out of the particles.

3. **(Currently amended)** A The process according to Claim 1, wherein individual particles are liquid impervious.

4. **(Currently amended)** A The process according to ~~any one of Claims 1 to 3 inclusive~~ Claim 1, which includes further comprising adding to the hydrophilic phase and/or to the hydrophobic phase and/or to the emulsion, a modifier for modifying the hydrophobicity ~~hydrophobicity~~ and/or charge of the enzyme.

5. **(Currently amended)** A The process according to ~~any one of Claims 1 to 4 inclusive~~ Claim 1, wherein the enzyme is a lipase.

6. **(Currently amended)** A The process according to Claim 5, wherein the lipase is selected from the group consisting of *Pseudomonas cepacia* lipase, *Pseudomonas fluorescens* lipase, *Pseudomonas alcaligenes* lipase, *Candida rugosa* lipase, *Candida antarctica* lipase A, *Candida antarctica* lipase B, *Candida utilis* lipase, *Thermomyces lanuginosus* lipase, *Rhizomucor miehei* lipase, *Aspergillus niger* lipase, *Aspergillus oryzae* lipase, *Penicillium sp* lipase, *Mucor javanicus* lipase, *Mucor miehei* lipase, *Rhizopus arrhizus* lipase, *Rhizopus delemer* lipase, *Rhizopus japonicus* lipase, *Rhizopus niveus* lipase, and Porcine Pancreatic lipase.

Int. Appl. No. : PCT/IB/2005/000192
Int. Filing Date : January 27, 2005

7. **(Currently amended)** A The process according to Claim 5 ~~or Claim 6~~, wherein the provision of the emulsion is effected by dissolving the enzyme in the hydrophilic or W phase and forming the emulsion by mixing the enzyme containing hydrophilic phase with the hydrophobic or O phase.

8. **(Currently amended)** A The process according to Claim 7, further comprising ~~which includes~~ selectively precipitating the enzyme at the interface when the emulsion is a O/W emulsion in which hydrophobic phase droplets are dispersed in a continuous hydrophilic phase, or within the droplet volume, when the emulsion is a W/O emulsion in which hydrophilic phase droplets are dispersed in a continuous hydrophobic phase.

9. **(Currently amended)** A The process according to Claim 7 ~~or Claim 8~~, wherein the cross-linking of the enzyme molecules is effected by means of a cross-linking agent which is added to the hydrophilic phase and/or to the hydrophobic phase and/or to the emulsion.

10. **(Currently amended)** A The process according to Claim 9, further comprising ~~which includes~~ adding to the hydrophilic phase and/or to the hydrophobic phase and/or to the emulsion, a temporary protectant that occupies active sites of the enzyme during the cross-linking, thereby inhibiting occupation of or reaction with the active sites by the cross-linking agent.

11. **(Currently amended)** A The process according to ~~any one of Claims 7 to 10 inclusive~~ Claim 7, further comprising ~~which includes~~ adding an amino acid to the emulsion to inhibit agglomeration of the individual enzyme particles.

12. **(Currently amended)** A The process according to ~~any one of Claims 7 to 11 inclusive~~ Claim 7, further comprising ~~which includes~~ recovering the enzyme particles from the second liquid phase.

13. **(Currently amended)** A The process according to ~~any one of Claims 7 to 12 inclusive~~ Claim 7, further comprising ~~which includes~~ extracting the first liquid phase from the enzyme particles.

14. **(Currently amended)** A The process according to ~~any one of Claims 7 to 13 inclusive~~ Claim 7, wherein the hydrophilic phase comprises water ~~and, optionally, a buffer in the water~~.

15. **(Currently amended)** A The process according to ~~any one of Claims 7 to 13 inclusive Claim 7~~, wherein the hydrophilic phase comprises a polyethylene glycol ~~and, optionally, water admixed with the polyethylene glycol~~.

16. **(Currently amended)** A The process according ~~any one of Claims 7 to 15 inclusive Claim 7~~, wherein the hydrophobic phase comprises an oil; a hydrocarbon; an ether; or an ester.

17. **(Currently amended)** A The process according ~~any one of Claims 7 to 16 inclusive Claim 7~~, wherein the emulsion is a W/O emulsion in which hydrophilic phase droplets are dispersed in a continuous hydrophobic phase, with a second enzyme, co factor and/or mediator being present in the hydrophilic phase.

18. **(Currently amended)** A The process according to ~~any one of Claims 5 to 16 inclusive Claim 5~~, wherein a triglyceride, which is hydrolysable by lipase, is used as the hydrophobic phase, with an O/W emulsion, in which hydrophobic phase droplets are dispersed in a continuous hydrophilic phase, being formed and with the dispersed hydrophobic phase contained within the cross-linked particles being hydrolyzed by the lipase during and after the cross-linking reaction.

19. **(Currently amended)** A The process according ~~any one of Claims 7 to 16 inclusive Claim 7~~, wherein an initial O/W emulsion, in which hydrophobic phase droplets are dispersed in a continuous hydrophilic phase, is formed, with the process including, before effecting the cross-linking, centrifuging the emulsion and separating a concentrated emulsion from a dilute hydrophilic phase, to increase lipase purity; and inverting the emulsion to form a W/O emulsion in which hydrophilic phase droplets are dispersed in a continuous hydrophobic phase, by the addition of a surfactant with a lower HLB value.

20. **(Currently amended)** A The process according ~~any one of Claims 1 to 19 inclusive Claim 1~~, wherein, to impart specific properties to the enzyme particles, a modifier is added to the hydrophilic phase and/or to the hydrophobic phase and/or to the emulsion.

21. **(Currently amended)** A The process according to Claim 20, wherein the modifier is a surfactant, for imparting enhanced enzyme activity and improved emulsion stability.

22. **(Currently amended)** A The process according to Claim 20, wherein the modifier is a precipitator for precipitating the enzyme onto the emulsion interfaces.

23. **(Currently amended)** A ~~The~~ process according to Claim 20, wherein the modifier is an additive for modifying the pH; ionic strength; viscosity; magnetic properties; agglomeration tendency; and/or zeta potential of the emulsion and/or the enzyme particles.

24. **(Original)** An enzyme particle, which comprises cross-linked enzyme molecules so that the particle is stable, with the particle being hollow, and in which the enzymes are immobilized, with a majority of active sites of the enzymes being orientated either internally or externally.

25. **(Currently amended)** ~~An~~ The enzyme particle according to Claim 24, which is spherical.

26. **(Currently amended)** ~~An~~ The enzyme particle according to Claim 24 ~~or Claim 25~~, which contains, in its lumen, a liquid.

27. **(Currently amended)** ~~An~~ The enzyme particle according to ~~any one of Claims 24 to 26 inclusive~~ Claim 24, wherein the enzyme is a lipase.

28. **(Currently amended)** ~~An~~ The enzyme particle according to Claim 27, wherein the lipase is selected from the group consisting of *Pseudomonas cepacia* lipase, *Pseudomonas fluorescens* lipase, *Pseudomonas alcaligenes* lipase, *Candida rugosa* lipase, *Candida antarctica* lipase A, *Candida antarctica* lipase B, *Candida utilis* lipase, *Thermomyces lanuginosus* lipase, *Rhizomucor miehei* lipase, *Aspergillus niger* lipase, *Aspergillus oryzae* lipase, *Penicillium sp* lipase, *Mucor javanicus* lipase, *Mucor miehei* lipase, *Rhizopus arrhizus* lipase, *Rhizopus delemer* lipase, *Rhizopus japonicus* lipase, *Rhizopus niveus* lipase, and Porcine Pancreatic lipase.

29. **(Currently amended)** A method of carrying out a reaction, comprising which ~~includes~~ allowing a reaction medium to undergo a reaction in the presence of a plurality of the enzyme particles according to ~~any one of Claims 24 to 28 inclusive~~ Claim 24, with the reaction thus being catalyzed by the enzyme particles.

30. **(New)** The process according to Claim 14, wherein the hydrophilic phase further comprises a buffer in the water.

31. **(New)** The process according to Claim 15, wherein the hydrophilic phase further comprises water admixed with the polyethylene glycol.